UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

April 16, 1999

Orlando Monaco
Naval Facilities Engineering Command
Environmental Contracts Branch
10 Industrial Highway
Lester, Pennsylvania

Re: Former Naval Air Warfare Center, Warminster, PA

Dear Mr. Monaco:

Please find below EPA comments on a Sites 6 and 7 Remedial Investigation Report dated December 1998 and a Sites 6 and 7 Feasibility Study Report dated January 1999. As discussed, these comments are identical in substance to those telefaxed to you last week.

SITES 6 AND 7 REMEDIAL INVESTIGATION REPORT

TITLE OF REPORT

It is suggested the title read as follows: "Remedial Investigation Report for Operable Unit 7 - Soil/Waste at Sites 6 and 7".

Response: *The title of the report has been revised.*

EXECUTIVE SUMMARY

Should be revised based on revisions to balance of the report. Please provide EPA an opportunity to comment on the revised version.

Response: *The Executive Summary has been revised in accordance with the comments and responses addressed in the remainder of this letter.*

1.1 PURPOSE OF REPORT

It is suggested the text in this section be replaced with the following:

"The purpose of this report is to describe remedial investigation (RI) results for soil and waste at Site 6 and Site 7, or Operable Unit Seven (OU-7), within Area B at the former Naval Air Warfare Center in Warminster, Pennsylvania. Based on preliminary RI results, a CERCLA removal action was performed at OU-7. The primary objective of this report is to describe the nature and extent of contamination at OU-7 after the performance of the subject removal action and to provide a baseline risk assessment based on this information. The results of the baseline risk assessment will determine whether additional

response actions are necessary for OU-7. The report also discusses the results of RI work performed prior to the removal action. Groundwater at Sites 6 and 7 (part of Operable Unit One) is being addressed by separate investigations and actions and will not be addressed by this report."

Response: *The text has been revised as requested.*

1.3. SITE BACKGROUND AND HISTORY

Second paragraph, add last a last sentence to read as follows: "Site 5, another disposal site in Area B, is being addressed by separate, ongoing investigations and is not addressed by this report."

Third paragraph: It is suggested this paragraph be deleted.

Response: *The requested change has been added to the third paragraph which has been modified to be consistent with the requested text.*

Figure 1-3: It is suggested this figure be deleted and that a revised version be included later in this section (see discussion regarding Figure 1-3 below).

Response: *Figure 1-3 has been modified in response to subsequent comments regarding this figure.*

Fifth paragraph: It is suggested the fifth paragraph be replaced with the following:

"At this time, the reuse plan approved by Federal Lands Reuse Authority identifies Area B as property to be used for recreational purposes. The property is currently targeted for transfer to Warminster Township under a Public Benefit Conveyance which would provide that the property be used for this purpose."

Response: *This text has been included in the modified text.*

Seventh paragraph should be replaced wit the following:

"Site 6 was initially reported to have been used for disposal purposes in the Navy Shore Activity Disposal Fact Form (Department of Navy, 1980) and Notification of Hazardous Waste Sites (Department of Navy, 1981). (See Appendix A for copies of these two reports). Site 6 reportedly operated from 1960 to at least 1980. Reported disposal activities at this site consisted of excavating pits by backhoe and filling the pits with waste paints and solvents, demolition waste, waste oil, flammable waste and grease trap waste. These pits were reportedly covered with two feet of soil. The number and dimension of the pits was not specified. (Note: The designation of this disposal site as Site 6 is consistent with the latter reference document rather than the former, which designates this disposal area as Site 7.) The disposal was reportedly within 900 feet of the Chief Staff Officer's Quarters, within 400 feet of the enlisted family housing quarters, and within 1000 feet of the Inertial Navigation Facility. Figure 1-4 indicates the projected location of Site 6 based on these distances.

Response: *The requested text has been added and the previous text deleted.*

The eighth paragraph should be replaced with the following:

"Site 7 was also initially reported to have been used for disposal purposes in the Navy Shore Activity Disposal Fact Form (Department of Navy, 1980) and Notification of Hazardous Waste Sites (Department of Navy, 1981). Site 7 reportedly operated from 1950 to 1955 and consisted of two trenches which were used for the disposal of a reported 700 cubic yards of industrial waste sludge cake generated at the NAWC wastewater treatment plant. (Note: Again, the designation of this site as Site 7 is consistent with latter reference.) Cover over the trenches reportedly included two feet of seeded soil. The trenches were reportedly 12' x 100' x 8' in dimension and located within 500 feet of the enlisted family housing quarters, 500 to 700 feet from the Center Inertial Navigation Facility and 800 feet from the quarters of the Chief Staff officer. Figure 1-4 indicates the projected location of Site 7 based on these distances."

Response: *The requested revision has been made.*

Ninth paragraph: Should be deleted if previous paragraphs are revised as suggested.

Response: *The text has been modified and appears later in the document.*

Tenth paragraph should be added and read as follows:

"Significant additional site background and history information were provided by an Aerial Photographic Site Analysis for the Naval Air Development Center (EPA, 1994). The subject report evaluated aerial photos from March 5, 1938 through March 8, 1990 and identified miscellaneous features within Area B which suggested possible or probable disposal pits and trenches. These features are identified on Figure 1-

X. The nature and location of many of these features correspond with the disposal reported by the Navy at Sites 6 and 7."

Response: *The requested text has been added.*

Figure 1-X should be included per above.

Response: *A figure showing the requested features has been included.*

Eleventh paragraph, last sentence should be revised to read as follows: "Historical photographs indicate that apparent demolition debris such as concrete was deposited in parts of the area of Sites 6 and through at least 1963 and, as a result, after the reported disposal of sludge in trenches at Site 7."

Response: *This text has been added to the modified text presented in paragraph 9.*

Twelfth paragraph: Should be included to discuss the interview results and/or other information which led to investigation of areas identified as "Site 7?". These areas should also be indicated on Figure 1-X.

Response: *Text regarding the interviews and information regarding possible locations for Site 7 have been added. The report and figures have been modified to delete the use of "Site 7?". These areas are consistently referred to by location.*

2.0 SUMMARY OF INVESTIGATIONS

It is suggested the text under this heading be replaced by the following and that the revised text appear under the heading, "2.1 INTRODUCTION".

"This section summarizes the nature of remedial investigation (RI) work performed at the subject sites. Specific findings regarding the physical characteristics and nature and extent of contamination at Sites 6 and 7 are presented. These findings are evaluated in detail in subsequent in subsequent chapters.

RI work addressing soils and waste at Sites 6 and 7 has been conducted in phases. The Phase I RI (SMC Martin, 1991) included cursory soil gas and geophysical surveys and several exploratory test pits, while the Phase II RI (HNUS, 1992) was limited to sampling of soil from four (4) borings. Based primarily on the findings of the Aerial Photo Site Analysis for NADC Warminster (EPIC, 1994), a more comprehensive Phase III RI was performed in 1996. Phase III geophysical and soil gas survey results for Sites 6 and 7 and soil sample results for Site 7 were reported in a Draft Phase III RI issued in 1996 (HNUS, 1996). The balance of Phase III RI results for Sites 6 and 7 were reported in a Draft Site 6 Removal Evaluation Report (B&R Environmental, 1996), which also recommended a removal action at

Sites 6 and 7. Based on findings of the Phase III RI work, a supplemental RI was performed at Sites 6/7 in 1997, with the findings included in a Preliminary Data and Risk Evaluation Report (B&R Environmental, 1997). Based on the RI work referenced above, a removal action was performed at Sites 6 and 7 in May through July of 1997. The results of post-removal action soil sampling and a preliminary evaluation of the residual risk presented by soils and wastes at Sites 6/7 were presented in a Draft Site 6 Summary Report issued in January 1998 (B&R Environmental, 1998).

The collective scope and results of all geophysical survey, soil gas survey, surface soil sampling and subsurface soil sampling investigations performed as part of RI work at Sites 6/7 are summarized below."

Response: *The requested text has been incorporated into the report.*

Each of the following sub-sections should reference the specific reports/letter reports which provide the basis for the summaries.

The rationale for referencing Figure 2-1 at this point is unclear. It is suggested that this figure be deleted or referenced later in the report.

Response: *We concur. The reference has been deleted.*

While the third sentence in the current text refers to "B&R Environmental letter reports, May and July 1995", these documents are not included in the References section. The references section should include these letter reports if they are referred to in the text or otherwise provide a basis for the summary.

Response: *Full references have been added to the text and the Reference Section of the report.*

2.1 GEOPHYSICAL SURVEY

The objectives of the geophysical survey work should be identified. It should be indicated that one objective of the survey was to identify locations of buried metal which may be indicative of drums. In addition, the definition and the significance of "geophysical anomaly" should be provided.

As noted above, the reports / letter reports which form the basis for this summary should be referenced. .

This section should include a figure which clearly indicates the full areal extent of the post-Phase I RI survey and the location of all geophysical anomalies which triggered followup investigations. At this time, the former is not provided and the latter does not appear to be provided. The following comments apply to figures currently in the report:

- While the text indicates Figure 2-2 marks the location of two anomalies identified during Phase I, the figure provides no such locations. (Instead, Figure 2-2 indicates the location of elevated soil gas levels.) In addition, the nature of the EPIC features on the figure are not provided in the key. As noted below, it is suggested that separate figures be considered to indicate EPIC features and geophysical anomalies.
- Regarding Figure 2-3, the key category of "Surface Depression and/or EM Anomaly / EPIC Feature" is too broad. Again, assuming a separate figure is included to identify EPIC features, this figure can be limited to identification of geophysical anomalies and surface depressions indicative of potential subsurface disposal. At this time, this figure does not appear to include all of the geophysical anomalies of interest.

- In the case of Figure 2-4, the subject area is unclear and no geophysical anomalies are identified.

Findings of the geophysical survey regarding the general nature of the subsurface of Sites 6 and 7 should be also be discussed. Of particular interest are any findings regarding the areal extent, depth and nature of debris and fill deposited at the site. The findings of the Phase I RI should be discussed to the extent appropriate, particularly the identification of a large anomaly which may indicative of the full areal extent of the impacted area.

As noted in comments on Section 2.4 below, it should be acknowledged that the effectiveness of geophysical survey in detecting potential disposal locations of concern may have been limited in areas covered with a significant layer of the debris/fill. For example, it is possible a geophysical anomaly was not detected at the location of trench TR4 due to the depth or nature of debris and fill deposited in this area.

Response: *This section, text and figures, has been revised.*

2.2 Soil Gas Surveys

The objective of the soil gas survey should be identified. It should be indicated that a primary objective was to identify potential sources of chlorinated VOCs in detected in groundwater. The RI Report for OU-1 should be referenced to provide more information regarding chlorinated VOCs in groundwater at Sites 6/7.

Response: *The objective and reference have been added to the text.*

Again, a figure should indicate the full areal extent of post-Phase I soil gas surveys. The current figures do not provide this information.

Response: *A new figure has been inserted into the text.*

Comments on specific, current figures are as follows:

In Figure 2-5, the nature of the "unconfirmed EPIC feature" is unclear. In addition, while the key includes "suspected disposal areas" and "surface depression and/or EM anomaly trends", all such features do not appear to be indicated on the figure.

Response: *Features have been added and the figure revised.*

Figure 2-5 does not effectively indicate the nature and extent of the elevated soil gas levels detected. For example, by consolidating all of the results in the area of P6F into two "multi-point" results, the significance of the results for this area relative to the rest of the site (and the removal action performed in this area) is unclear. A "blowup" of soil gas results for the area of P6F should be provided to better indicate the nature of the survey and soil gas levels in this area. (To date, such a figure has only been included in "rough draft form" in a letter report.)

Response: *Additional text has been included. No additional Pit P6F specific figure has been added. Such a figure is not needed to support the objective of the RI and subsequent FS.*

It is unclear why this section (and the report) provides a detailed discussion of the survey methods but does not discuss the survey results. A discussion of the results should be included and indicate that soils in the area of P6F appeared to be a significant potential source of chlorinated VOCs in groundwater. It

should also be indicated that, in response to multiple but lower detections of chlorinated VOCs in trenches TR11 and TR12, a monitoring well was installed downgradient of these locations and that chlorinated VOCs were not detected in the subject well, suggesting that these trenches are not a source of groundwater contaminants.

Response: *Additional text has been included as requested.*

Again, as noted in comments on Section 2.4 below, it should be acknowledged that the effectiveness of soil gas survey in detecting potential disposal locations of concern may have been limited in areas with a significant layer of debris/fill.

Response: *This statement regarding soil gas effectiveness was not added. Soil gas surveys were successfully completed throughout the study area. Limited contaminant detections in the area of question are more likely to be related to the lack of VOC contamination found in the area as evidenced by the analysis of subsurface soil and waste samples collected in this area.*

2.3 Surface Soils

No map of surface soil locations is provided. A map should be provided to indicate the location of all sample numbers included in Appendix B.

Response: *A figure has been included.*

As currently written, the text suggests that only Phase II RI results are included in Appendix B and evaluated. Appendix B should include all results, including those from the Phase III RI.

Response: *All results are included. The text has been clarified.*

2.4 SUBSURFACE INVESTIGATIONS

The next to last paragraph references the "sampling and analysis plan". This reference should either be specifically identified or (preferably) be deleted (i.e., if this plan is referenced, than all other plans should also be referenced).

Response: *This reference has been deleted from the text.*

The text should indicate that logs for all soil borings and test pits are included in the appendices. Sample logs should also be included in the appendices.

Response: *A reference to the Appendices has been added. Sample Logs have also been included.*

This subsection should also summarize the physical nature of the subsurface at Sites 6/7 based on an evaluation of observations in the test pits and soil boring logs. As requested in earlier comments, the report should estimate the area where demolition debris and fill was deposited on the original ground surface and provide information regarding the depth and nature of the deposited fill, debris and the soil cover. It should noted that industrial waste was found within this layer of deposited fill and debris at the location of a geophysical anomaly TR6E. In addition, it should be noted that an apparent industrial waste sludge was detected in the projected location of trench TR4 at a depth ranging from 2 to 9 feet below ground surface and that trench TR4 was apparently excavated into the original ground surface and covered with the subject layer of debris, fill and/or soil. It should be also be noted that disposal trenches/pits outside of the area of debris/fill deposition (e.g., trenches TR11 and TR12) were apparently excavated into the original and are generally covered with several feet of soil.. The distance from ground

surface to bedrock across the site should be generally described as well.

Response: *Summary text presenting the requested information has been added.*

It should be noted that the effectiveness of geophysical and soil gas surveys in detecting potential disposal locations of concern may have been limited in areas covered with a significant layer of deposited debris/fill such as that observed at many test pit/boring locations.

Response: *No additional text has been added to this section. The revised text under Section 2.1 presents the requested statement.*

The nature and depth of the surface soil cover across the site at the time of RI work should be described. (The section on the removal action should describe actions taken which impacted surface soils.) In addition, per previous comments, it should be noted that in certain cases (e.g., parts of trenches TR11 and TR12), the original soil cover had collapsed into the trench and there was minimal soil cover.

Response: *Summary text presenting the requested information has been added.*

2.5 REMOVAL ACTIONS

The first sentence refers to a "1996 investigation". The specific report of interest should be referenced. In addition to referring to the Foster Wheeler workplan, the final report by Foster Wheeler describing the actual work performed should be referenced. It should be indicated that a primary objective of this response action was to remove potential source(s) of chlorinated VOCs in groundwater within Area B. It should be noted that this action also removed industrial waste found within the layer of deposited fill/debris at the location of geophysical anomaly 6G. The nature of material removed from the location of pit 6A should be identified. In addition, it should be noted that this response included removal of surface debris (e.g, demolition debris), placement of a soil cover and grading as applicable. It is worth noting that the a significant area of exposed construction debris observed during the RI (see Figure 2-2 of FS) was removed and/or covered with soil.

Response: *Reference to the " 1996 investigation" has been revised. The final FWEC report is referenced in paragraph five. The objective of the removal has been clarified. Details regarding the removal have not been added to this report as they are presented in other final documents. The content of test pit findings has been presented in Section 2.4. New text regarding surface debris has been added.*

The second and third paragraph indicates that cleanup goals were "...established by the BCT". This is not the case. As indicated in the third paragraph, cleanup goals were identified by the Navy in the Draft Verification Sampling Plan (B&R Environmental, August 1996). It should be noted that "cleanup goals" were risk-based concentrations for recreational exposure to soil via direct contact pathways and, in the case of VOCs, concentrations protective of groundwater quality. (Per later comments, the report should provide a rationale for concluding that non-VOCs in soils at Site 6/7 do not present a threat to groundwater quality.)

Response: *The development of clean-up goals has been clarified. Reference to the BCT has not been removed. The BCT played an integral role in defining clean-up goals and in determining appropriate actions during the removal operation.*

Third paragraph, last sentence: This sentence is confusing and should be rewritten.

Response: *See above response.*

Fourth paragraph: While the second sentence refers to "PADEP soil cleanup guidelines", none are referenced. A specific reference should be provided or this should be deleted. It is indicated that "...actual sampling locations were field approved by EPA oversight contractors". This sentence should be deleted. Also, it is indicated that analytical results were reported to the BCT. Again, this is irrelevant and should be deleted.

Response: *The reference to the "PADEP guidelines" has been deleted. The fact that the BCT and EPA were consulted with and participated in directing and evaluating the removal action is accurate. No change has been made to these statements.*

Suggested the second and third sentences of the last paragraph read: "Table 2-1 presents a summary of the analytical results of samples collected upon completion of excavation for each area and risk-based concentrations for recreational exposure which served as soil cleanup levels for these areas. (Note: In no case were VOCs detected during verification sampling in the subject areas). This table summarizes data initially reported by Brown and Root Environmental in Preliminary Post-Removal Sample Analytical Results letters dated _____ through _____ (see references). In all cases, the analytical results for final excavation locations are below the established cleanup levels."

Response: *This paragraph has been revised.*

The letters discussed above contain additional observations regarding the nature of subsurface materials in the three areas addressed during the removal work. Again, any observations which provide additional information regarding the nature and extent of waste, fill, debris and soil cover at each of the three removal areas should be discussed.

Response: *Because the letters are fully referenced along with the final FWEC closeout report, the Navy does not feel it is necessary to provide the requested detail. The requested information is not needed to support the RI or FS.*

Of the 3,698 tons of material removed, what portion was estimated to be debris or "clean" fill and what portion waste of concern.

Response: *All material was characterized for and disposed of off-site as indicated in the FWEC Closeout report.*

The nature of hatched areas in Figure 2-7 is not identified.

Response: *The figure has been revised.*

The report should identify whether any drums were encountered during any of the excavation activities under the removal and report any information in this regard. (See comments below on Section 4.2 requesting that information regarding drums encountered in test pits during RI work be reported.)

Response: *Observations regarding drum remnants have been included in Section 2.4. Further description of the removal action is not necessary to support the RI.*

4.0 NATURE AND EXTENT

The title of the section should read "Nature and Extent of Contamination".

The first sentence should read "...was limited to three areas within Sites 6 and 7."

Response: *Revisions made.*

The second sentence should be replaced with the following: "Soils / wastes within these areas were removed until all verification sample results were below cleanup criteria established in the Verification Sampling and Analysis Plan (Tetratech, 199_). As such, the soils in these areas are documented as presenting no unacceptable risk and therefore will not be evaluated in this section. Rather, this section evaluates analytical data for soils in areas at Sites 6 and 7 not addressed by the subject removal action."

Response: *This paragraph has been revised. The reference to acceptance criteria remains in the paragraph but the VSAP is referenced.*

Second sentence, second paragraph indicates that "...the data from Site 6/7 disposal area are presented separately from the data collected in the other areas investigated south and southeast of the disposal areas". A rationale for separating this data should be provided.

Response: *This sentence has been deleted.*

4.1 SURFACE SOIL

While Section 2.3 indicates 33 surface soil samples were collected at Site 6, here the text indicates 29 surface soil samples were collected "...from within Sites 6/7 but outside the three removal areas." It is not clear why the number of the samples differs.

Response: *The "33 samples" includes surface soil samples collected from within removal areas and this material; has been removed from the site. This sentence has been clarified.*

Does Figure 4-1 consider the results of sampling in the "south and southeast Site 7(?)"? If so, there is a pattern to the detections of metals exceeding Recreational RBCs, i.e., the detections are limited to the area where aerial photos indicated disposal.

Response: *Figure 4-1 presents only data from Sites 6 and 7, the other investigation areas are presented separartely.*

In the second sentence, second paragraph should read "...at levels the below quantitation limit."

Response: *The third sentence has been corrected.*

Third paragraph, fifth sentence regarding comparison to RBCs should be removed. (The subject table does not include RBCs.)

Response: *The sentence does not indicate that Table 4-1 presents RBCs. No change has been made.*

While the fourth paragraph indicates which substances were detected above RBCs, neither Table 4-1 or any other information supports this discussion. Either the recreational RBCs should be included in Table 4-1 or this discussion deferred to a point where a table with the RBCs is referenced.

Response: *The text refers to Section 5 for a detailed discussion of RBCs. Additional text has been added for clarification.*

Tables 4-2 and 4-3 - The source of the federal and Pennsylvania soil criteria should be referenced. With to regard to VOCs, another pathway of concern is groundwater. As a result, detected VOC levels should be compared to EPA screening levels protective of groundwater.

Response: *Reference and additional text have been added.*

4.2 SUBSURFACE SOILS

Does the total of 86 subsurface samples include the "south and southeastern areas of Site 7(?)"? Were subsurface soil samples collected in these areas ? If so, what were the results ?

Response: *No the number of samples does not include those collected from the southern and southwest investigation areas. This sentence has been clarified. The south and southwestern area investigation subsurface sample results are discussed in the last paragraph of this section.*

Third sentence, second paragraph: While it is indicated the two referenced sample results "...do not show any pattern", a "pattern" cannot be established with just two results. Please clarify.

Response: *This sentence has been clarified.*

While Figure 4-3 indicates detected concentrations above recreational RBCs, these RBCs are not identified in the tables or otherwise. Table 4-3 should include this information or the subject figures should be presented once this information is provided.

Response: *Reference text has been added.*

While the text indicates there is "little contamination pattern" apparent in the distribution of metals concentrations, this does not appear to be the case. First, elevated arsenic levels again appear to be limited to areas where aerial photos and visual observations suggested disposal activity. With regard to the detection of chromium and thallium, locations with elevated levels were limited to the estimated locations of trenches TR4, TR11, TR12 and, apparently, the location of a surface depression southwest of trench TR11. It is worth noting that elevated levels of cadmium and lead were also limited to trenches TR4 and TR11.

Response: *This text has been revised.*

Second paragraph, page 4-18: Again, thallium and chromium concentrations in excess of the RBC do not "...appear to be widespread throughout the site."

Response: *This text has been revised.*

Fourth paragraph, page 4-18: Again, contrary to the first sentence, there is an apparent pattern to the location of elevated levels of individual contaminants as well.

Response: *This text has been revised.*

Figure 4-3: The basis for the selection of the sample results depicted in this table should be identified. At this time, it is unclear why certain, apparent significant results are not included in the figure. For example, the risk assessment later identifies antimony as COPC which in certain cases results in a hazard index of up to 0.67 (e.g., for subsurface soils in Zones 1 under the recreational pathway).

Response: *As indicated, the data presented is for Site-wide contamination. Antimony was not selected as a COPC considering all site data because the 95% UCL concentration, considering all site-wide data, was similar to background data concentrations.*

Figure 4-4: The basis for the area of the three "potential risk zones" should be explained. For example, why was the location of soil boring SB40 not included in Potential Risk Zone 1, the location of TP40 not included in Potential Risk Zone 3 or the surface depression southwest of TR6D not considered a potential risk zone ? Does the data summarized in Tables 4-9, 4-10 and 4-11 consider only sample results from the

areas identified in Figure 4-4 ? This should be clarified.

Response: *Additional text has been provided.*

Analytical results for sample S6-TP-2602 are not included in the report.

Response: *Sample S6-TP-2602 is a duplicate sample (sample S6-TP-2601).*

Table 4-8: the first page of this table should read "...In Potential Risk Zone 3 Subsurface Soil, Sites and 7." Similarly, Tables 4-10 and 4-11 should also refer to a "Potential Risk Zone" rather than "Hot Spot".

Response: *The header has been corrected.*

Site observations and the lack of contaminants above PRGs in soil boring SB28 indicate that Zone 1 includes two separate disposal locations of concern - (1) trench TR 12 and (2) an unnamed waste pit/trench which was discovered through the observation of a surface depression and subsequently investigated by test pit TP08.

Response: *Samples from soil boring SB28 did contain contaminants of concern. Additional text regarding it's inclusion in Zone 1 has been added.*

Last paragraph, page 4-18: It is indicated that "...in general, the samples that contained the highest levels of contaminants were collected from depths that ranged from 4 to 9 feet below ground surface." Rather than speak in general terms, site specific observations regarding the depth of waste and/or contaminated soil should be identified for each area. For example, for Zone 3, at Test Pit TP-29, a course grained oxidized material with yellow chunk of material was found from 7' to 10' in depth and covered with 4' of silty brown soil and 3' of concrete demolition debris.

Response: *Additional text has been provided.*

In certain cases, waste with elevated levels of hazardous substances appears at depths of less than 4 feet. For example, in Test Pit TP-40, which was excavated immediately adjacent to the Patrol Road, a dark-brown to black oxidized material was found at 2' to 5' in depth and covered with 2' of brown silty clay soil. While not considered part of Zone 3, the wastes observed in Test Pit TP-40 may be an extension of materials encountered in Test Pit TP-29. These test pits were excavated approximately 70 feet apart along the projected axis of trench TR4. (There is no information regarding the nature of subsurface materials between these two locations.) Otherwise, based on a cursory review of the Test Pit Logs for TP-35 and TP-36, waste of apparent elevated metals levels of potential concern appears to range 7' to 12' in depth and to range in thickness from 1' to 3'. It is unclear from the logs what the area of interest may be but it may be larger than Zone 3 as currently projected.

Response: *Text has been added regarding the depth of waste and the rationale for establishing Zones 1, 2, and 3. The FS will address the southwestern portion of Zone 3. This was not included in the initial risk evaluation due to the lack of strong evidence of the presence of a trench. However, as indicated, this area will be included in the evaluation of alternatives dealing with Zone 3 in the FS.*

While drums containing varying amounts of waste material were encountered in test pits excavated during the RI, there is no mention of this in the report. Following information should be provided regarding these drums: 1) location, 2) number, 2) condition, 3) markings and 4) nature, appearance and amount of any waste material within. Figure 4-3 should clearly indicate samples in the figure were actually collected from material in drums or provide the location of any such samples which are not

included in the figure. Based on a review of analytical data, samples S6-TP-1001, TP-1003, TP-2601, -TP-27WI, -TP-1404 were collected from drums. In addition, the results of soil sampling conducted to assess any impacts of the drum disposal on soil should be identified and discussed. The text should also identify whether geophysical anomalies were identified at the locations of the subject drums. It should be indicated that the drums and their contents were removed from the site and the characterization data therefore was not included in the risk assessment contained in this report (if this is the case).

Response: *Text has been added to Section 2.4 regarding the location of drum remnants. This same text addresses the analytical results.*

Generally, at some point in this report, available data should be evaluated to support the apparent conclusion that elevated levels of hazardous substances in soils/waste at Site 6/7 do not present a threat to groundwater. At a minimum, available groundwater data should be evaluated to identify whether these substances are currently in groundwater at unacceptable levels.

Response: *See Section 4.3 as originally submitted. Also, additional text has been added throughout the report.*

5.0 HHRA FOR NAWC WARMINSTER SITES 6 AND 7

5.7 CONCLUSIONS

It is concluded that "...the noncarcinogenic His are greater than 1.0 for the subsurface soil (site-wide, Zones l, 2 and 3) recreational exposures." As discussed in Section 5.6, it should be clear that this is the case if the ratio of hexavalent chromium to total chromium at Site 6/7 is assumed to be equal to the maximum ratio found at NAWC to date. This could be considered a conservative assumption. As indicated, if a "representative concentration ratio" is applied, only the chromium in subsurface soil in Zone 3 would present an unacceptable risk under recreational use. Clearly, the risk posed by chromium in soils at Sites 6/7 would be best estimated with the benefit of site-specific concentrations of hexavalent chromium. However, such data is not available at this time.

Response: *The text has been revised as suggested.*

APPENDIX A

Remove obsolete EPA site disposition forms.

Response: *The EPA Potential Hazardous Waste Site Final Strategy Determination Forms (T2070-S)nand the PADER inspection memorandum have been removed from the Appendix.*

SITES 6 AND 7 FEASIBILITY STUDY REPORT

TITLE

It is suggested title be revised to read, "Feasibility Study Report for OU-7 - Soil/Waste at Sites 6 and 7".

Response: The title of the report has been revised.

EXECUTIVE SUMMARY

Should be revised based on revisions to balance of the report. Please provide EPA an opportunity to comment on the revised version.

Response: The executive summary has been revised in accordance with comments and responses on the report text.

1.3 SITE BACKGROUND AND HISTORY

The area addressed by the FS should be clearly identified. All areas determined in the RI to present an unacceptable health risk should be included. Figure 1-3 does not include all of the subject areas, e.g., Zone 1 is not included within the area of Sites 6 and 7 in the subject figure. In addition, all locations which contribute to the unacceptable site-wide risk do not appear to be included. Figure 1-3 should also indicate the extent of the area used for waste disposal and placement of fill material.

Response: This figure has been revised to include the entire area of concern.

Since the RI concluded there was no disposal activity nor an unacceptable risk associated with the areas designated as "Site 7?", it is suggested these areas not indicated on figure 1-3.

Response: Figure 1-3 has been revised. This area is no longer noted or referred to in that manner in the text.

Fourth paragraph: See comments on the RI regarding this paragraph.

Generally, the balance of this section regarding the background and history of this site should be consistent with EPA comments on this section in the RI.

Response: This section has been revised to provide a summary that is consistent with the RI that has been modified in response to EPA comments. The revised RI is referenced in this section.

1.4 NATURE AND EXTENT OF CONTAMINATION

Suggest first paragraph read as follows:

"As indicated in Section 1.3, the Navy conducted a removal action at Site 6 and 7 in 1997. This removal focused on soils contaminated with VOCs which presented a potential threat to groundwater quality and certain locations where soils presented a potential unacceptable risk through direct contact exposure pathways. The soils and/or wastes described below and otherwise addressed by this feasibility study are those that remain after the subject removal action."

Response: Text has been revised to reflect the intent of this comment.

Second paragraph: It is indicated that VOCs were identified at elevated levels in only two surface soil samples. This statement is ambiguous and should either be clarified or deleted. In fact, VOCs were detected in surface soils at levels above background at more than two locations (e.g., "Site 7?") but the detected levels did not present a threat to groundwater or exceed screening levels protective of direct contact. It is also indicated that levels of metals in surface soils which "...did exceed risk-based screening

levels did not exhibit any pattern of contamination." This is not the case. Elevated levels metals were found in surface soils within areas where the RI found disposal activity occurred. However, as should be noted in the next sub-section, the risk assessment determined these surface soils at Site 6 and 7 do not present an unacceptable risk under the planned recreational use.

Response: This text has been revised. Only sample data collected from outside of the removal areas is addressed.

Third paragraph: It is indicated that "...most waste materials were encountered at depths ranging from 4 to 9 feet below ground surface". On the other hand, the RI found that in certain areas, waste/soil contributing to unacceptable "site-wide" and/or "zone-specific" subsurface soil risks was one to four feet below ground surface. For example, at least part of the waste of concern in each of the designated "zones" (Zones 1, 2 and 3) is within 2 feet of ground surface.

Response: The text has been revised to indicate the presence of some limited waste present at shallow depths.

Third paragraph: Suggest replacing the sentences that currently read, "Only one sample outside of the initial removal areas contained elevated levels of one VOC. No VOC contamination would indicate that Sites 6 and 7 are a source of the groundwater contamination was identified" with the following:

"In no case do detected VOC concentrations in remaining soils exceed soil screening levels protective of groundwater."

Response: The text has been revised as requested.

Third paragraph: It is indicated that "...arsenic, chromium and thallium were the main contaminants found at significant levels throughout the site." This statement is ambiguous. More specifically, as indicated in Figure 4-3 of the RI, arsenic was elevated throughout the area known to have been used for disposal, while chromium and thallium levels were elevated in waste within trenches TR4, TR11, TR12, and unnamed apparent former trenches southwest of TR11 and southeast of TR12. In addition, cadmium was elevated in trenches TR4 and TR11.

Response: The text has been revised. However, the statement regarding arsenic, chromium, and thallium is correct and remains in the text.

1.5.1 SUMMARY OF CARCINOGENIC RISKS

Second paragraph: It is indicated that "...the risks associated with the future residential receptor exposure to subsurface soils slightly exceed the EPA's target risk range (2E-4)." It should be noted that this exceedance is primarily due to the concentration of beryllium in the subject soils and that the beryllium concentrations appear to be within background levels (if this is the case).

Response: The text has been revised to clearly differentiate residential and recreational risks and to provide a qualifying statement regarding carcinogenic risks.

1.5.2 SUMMARY OF NONCARCINOGENIC RISKS

First paragraph: It should also be stated that site-wide surface soils do not present an unacceptable risk under the residential scenario.

Response: This is not the case. As presented in the RI and in the second paragraph of section 1.5.2,

these risks do exceed the EPA threshold. This section has been revised to more clearly differentiate between residential and recreational risks and to provide clarification regarding the risk uncertainties and the depth of the waste materials.

Fourth paragraph: It is indicated that the presence of elevated arsenic and beryllium at the site is attributable to the disposal of industrial waste treatment sludges, while the source of elevated thallium is unknown. However, the RI data suggests that elevated levels of chromium and cadmium, not arsenic and beryllium, are associated with the disposed sludge. In addition, the data suggests that the elevated levels of thallium also may be associated with the sludge.

Response: See above response.

Fifth paragraph, third sentence: As noted earlier, subsurface soils which present unacceptable risk are, in certain cases, 1' to 2' within ground surface and not limited to 4 feet deep or greater as indicated.

Response: See above response.

Fifth paragraph, fourth sentence: It should be clear that the risk assessment did not assume that all detected chromium was hexavalent. Instead, it was assumed that a certain percentage of the detected chromium was hexavalent.

Response: See above response.

2.1 REMEDIAL ACTION OBJECTIVES

The primary objective should be protection of human health and the environment. The stated objective of facilitating property transfer would be met by meeting this primary objective and should be considered "secondary" in nature.

Response: The sentence has been revised in accordance with the comment.

It is indicated that RAOs have been developed for recreational use only. However, PRGs protective of residential use are referenced in Section 2.4.

Response: Clarification has been provided in the text.

Second paragraph: It should be clear that the development of RAOs for soil/waste at Site 6 and 7 considered the potential for contaminant migration from soil to groundwater. EPA comments on the RI regarding this pathway should be addressed to confirm this pathway has been adequately considered.

Response: EPA comments on the RI have been noted and have been responded to.

It should be clear that both surface and subsurface soils at the site present an unacceptable risk under the residential use and that any protective remedy should ensure that this risk is addressed.

Response: The text has been revised to address this concern.

2.2 CHEMICALS AND MEDIA OF CONCERN

Since metals are not "chemicals", COCs are more appropriately "contaminants of concern".

Response: Text has been revised as requested.

2.3 COMPLIANCE WITH ARARs AND TBCs

While not applicable, federal and/or state requirements for closure of landfills should be considered to be potentially relevant and appropriate, particularly those of 25 PA Code 75, Solid Waste Management Rules and Regulations. Table 2-2 should indicate these requirements are potentially relevant and appropriate. Additional potential ARARs to consider in the screening phase are RCRA Subtitle C and Subtitle D requirements for addressing closure of landfills (40 CFR 264 and 40 CFR 258, respectively) and corresponding state requirements addressing closure of landfills under 25 PA Code 264 and 25 PA Code 273. Table 2-2 should indicate these requirements may also be potentially relevant and appropriate.

Response: Table 2-2 has not been revised to reflect this comment. As per letter from the PADEP dated April 5, 1999, the PADEP has determined that landfill closure regulations are not applicable, relevant, or appropriate for Sites 6 and 7. However, consistent with PADEP and federal requirements, RCRA, Solid Waste, and Hazardous Waste regulations have been cited as they relate to the proper handling, transportation and disposal of excavated materials from the site.

The title of Table 2-2 should be modified to read "Summary of Potential ARARs and TBC Criteria".

Response: The title of table 2-2 has been modified.

2.4 PRELIMINARY REMEDIATION GOALS

It should be stated the PRGs were calculated based on exposure assumptions used in the baseline risk assessment.

Response: The requested statement has been added to the text.

Table 2-3

The PRGs in this table appear to apply to recreational receptors. This should be stated clearly in the title of the table.

Response: This is stated in the text and in the table footnote. The title has been modified to further clearly state recreational exposure.

It is stated that the PRGs presented in this table and Table 2-4 "...are based on the most conservative approach." This approach (e.g., the risk levels associated with the PRGs in the table) is not identified in Table 2-3 and is not clearly identified in Table 2-4. For example, in Table 2-4, it is unclear whether the cleanup goal of 1E-05 for carcinogens is that risk for each carcinogen or to achieve a cumulative carcinogenic risk of 1E-05.

Response: These statements have been clarified.

It is noted that Figures 2-1 and 2-2 indicate the site-wide subsurface soils and three specific zones which have been identified "...for possible remediation". However, the three "potential risk zones" identified in Figure 2-1 do not indicate the full extent of soils which exceed PRGs in the vicinity of these zones (see comments below). In addition, neither figure indicates the soils outside of the vicinity of these three zones which exceed PRGs, e.g., soils in the unnamed apparent former trench southwest of trench TR6D.

Response: Text and figures have been revised. It is agreed that the introduction of individual zones of contamination for possible excavation alternatives is prematurely presented at this point of the FS. The text has been revised and the zones are discussed later in the text under the alternative development.

Last paragraph: It is indicated that "...it is assumed that surface soil would not be removed and that this

soil would become contaminated a similar concentration as the subsurface soil". This statement and the intent of the statement is unclear. Please clarify.

Response: The subject text has been clarified.

It is indicated that a total excavation depth of 12 feet was assumed because this is the average depth of weathered bedrock across the site. However, in no case were PRGs exceeded in soils collected at this (or a similar) depth. In Zone 1, the material of concern ranged from 1' to 8' in depth, in Zone 2 from 3' to 7' in depth and in Zone 3 from 2' to 10' in depth. The depth of excavation at each location should be refined based on RI data.

Response: The text within this section has been revised. For estimating purposes it is assumed that over-excavation will be required to achieve PRGs. The depth to bedrock may be the limiting factor as was experienced in other portions of Sites 6 and 7. For cost estimating purposes it is assumed, based on site data, that an average depth to bedrock is 12 feet.

It is unclear why the material exceeding PRGs in the apparent trench southwest of TR6D was not considered for excavation. Unless adequate rationale can be provided, removal of this material should also be assumed.

Response: As indicated above the text for this section has been revised. Additional text regarding the three zones has been added in later sections.

2.5.1 Zone 1

As noted earlier, site observations and the lack of contaminants above PRGs in soil boring SB28 indicate Zone 1 includes two separate disposal pits/trenches of concern - trench TR 12 and an unnamed, apparent pit/trench investigated by test pit TP08. Based on the test pit log for TP08, the dimensions of this additional, apparent pit/trench are not apparent. In this case, the areal extent of excavation necessary to remove soil above PRGs associated with pit/trench may be underestimated. The depth of waste of concern in TR12 appears to be from 1' to 6', while the depth of waste in the latter appears to be from 2' to 8'.

Response: The text has been revised. This comment was considered in revising Section 4 of the report.

2.5.2 Zone 2

The waste of concern appears to range from 2' to 8' in depth, with bedrock observed at a depth of 8'.

Response: See above response.

2.5.3 Zone 3

The basis for the area of excavation (45 feet X 135 feet) is unclear. The area of excavation would include the location of test pit TP40, where waste of concern was identified at 2' to 5' in depth, and the location of test pits TP29, TP36 and TP35, where waste exceeding PRGs was identified at depths ranging from 7' to 12'. The estimated length of this area is 220 feet rather than 135 feet. The basis for the estimated width of 45' is unclear. Where the width of the trench was documented in test pit logs (TP35 and TP38), the trench was found to be 11' and 19' wide.

Response: See above response.

Figure 2-1

A small hatched area is indicated about 150 feet northeast of Zone 3. It is unclear what this represents.

Response: The figure has been modified and the hatched area removed.

At least two soil sample identifiers appear to be incorrect. S6-SB-3806 should read S6-SB-3906 and S6-SB-3909 should read S6-TP-3908.

Response: The mislabeled samples have been corrected on Figure 2-1.

Per comments on the RI, it should be clear that five sample identifiers in this figure are associated with drum wastes (samples S6-TP-1001, TP-1003, TP-2601, -TP-27WI, -TP-1404) which have been removed (if this is the case).

Response: No data is shown for the five sample points in question. The sample points are not relevant to the volume calculation therefore no change has been made.

2.5.4 Site-Wide Excavation

It should be clear that the area identified in this case is an estimate and may be greater than or less than that indicated. As noted, the average depth of the required excavation is likely to be less 12 feet.

Response: As indicated above, the text for this section has been revised.

Figure 2-2: Note that the "significant exposed construction debris" indicated on the figure is no longer present.

Response: This figure has been deleted from the report.

3.0 IDENTIFICATION AND SCREENING OF TECHNOLOGIES

3.3.1 PRELIMINARY SCREENING

Table 3-1 - Preliminary Screening of Technologies and Process Options

The description of the cap options should indicate which options would address potentially relevant and appropriate landfill closure requirements under RCRA Subtitle C and D and 25 PA Code 75.

Response: As indicated in the April 5, 1999 letter from PADEP, this site is not considered to be a landfill and therefore the RCRA and landfill closure requirements are considered to be potentially relevant or appropriate.

It is not clear that an adequate soil cover is in place over Zones 1, 2 and 3 as indicated. In addition, such a cover would be required on a "site-wide" basis.

Response: This statement has been revised. The Navy has not placed cover material over the portions of the landfill that had been identified as potentially requiring such cover as was assumed in the draft report.

The "Size Separation" process option under "Ex-Situ Treatment" should be retained. Contrary to the

screening comments, highly heterogenous materials are expected to be encountered in significant quantities in the case of excavation, particularly where waste of concern has been covered with "clean fill", e.g., concrete demolition debris. This separation process could result in significant cost savings by eliminating the offsite disposal of clean fill.

Response: It is doubtful that significant cost savings would be achieved through size separation. Typically the type of cost savings indicated by the reviewer are a result of being able to identify and isolate a particular grain size or type that contains the bulk of the contamination. This is not the case with OU-7 soil contamination. However, size separation has been included as a possible component for separating out large debris and rock that may be handled or disposed of differently. It is not anticipated that any of the contaminated media will be classified as "clean fill" as indicated by the reviewer. Under PADEP direction, only that excavated material that achieves PRGs may be used as fill on the site. Material sent off site can not be used as "clean fill" at other locations unless it passes the PADEP Clean Fill Standard.

Table 3-2 - Detailed Evaluation of Technologies and Process Options

In evaluating the cap process options, the finding that the remaining soil / waste does not present a threat to groundwater quality should be considered.

Response Cap options are not evaluated in the report, see above responses regarding the application of landfill closure requirements. A threat to groundwater was not identified as a concern in the final RI. That document addresses the groundwater issue and has been referenced in the text of the FS.

While "Chemical Fixation / Solidification" is included in the screening phase of Table 3-1, it was not included in this table. This should be corrected.

Response: The noted correction has been made.

4.0 DEVELOPMENT AND SCREENING OF ALTERNATIVES

Alternatives 2 through 4 should clearly indicate that a major component of the remedy is a vegetated soil cover. This cover should prevent direct contact with soils which have been determined to present an unacceptable risk under the reasonably anticipated land use. To achieve this objective, the cover should be two feet in depth. This should be indicated under the subject alternatives.

Response: The requested text has been added.

4.2 DEVELOPMENT OF ALTERNATIVES

4.2.2 Alternative 2: Institutional Controls and Monitoring

This alternative should be referred to as "Vegetated Soil Cover and Institutional Controls". While it appears that a good portion of the site may have the requisite vegetated cover, it should be acknowledged that certain areas may not and assumed that some captital cost will be incurred for placement of additional soil cover and/or growth of vegetation. Maintenance should include not only replacement of cover material but maintenance of vegetation to prevent erosion of the cover. With regard to the institutional controls, the objective of these controls should be to ensure the integrity of the soil cover. In addition, these controls should include procedures for those cases where the cover can be temporarily or permanently altered, e.g., certain construction activities.

Response: Institutional Controls are not only to protect the cover material but to restrict activities to

nonresidential uses and to control excavation. This is stated in more detail in Section 5 of the report.

The basis for the area projected to be covered should be provided. In addition, it should be acknowledged that there is some uncertainty regarding the area to be covered and that exploratory borings, test pits or similar means should delineate the actual extent of the cover.

Response: This section presents the general alternatives. A detailed presentation of the alternatives is presented in Section 5. This description provides the information requested.

4.2.3 Alternative 3: Focused Excavation, Zones 1 and 2; Offsite Treatment/Disposal; Institutional Controls

This alternative should be referred to as "Focused Excavation and Offsite Disposal, Zones 1 and 2; Vegetated Soil Cover and Institutional Controls". It is unclear why excavation of material in the unnamed apparent trench southwest of trench TR6D is not included under this alternative. Treatment of excavated soil from Zones 1 and 2 is unlikely to be necessary. As a result, treatment should not be assumed to be a component of this remedy. As under Alternative 2, the remedy should include a vegetated soil cover over the entire area determined to present a potential unacceptable risk. To ensure integrity of the cover, a cover over the entire site, including the areas of Zones 1 and 2, should be considered.

Response: The alternative and the text have been revised to include a vegetative cover. The RI report and the revised Section 1.4 of this report present detail as to the formulation of Zones 1, 2, and 3. Treatment has been retained as a potential process option for this and other alternatives. Detailed descriptions and costing for each is presented in Section 5.

4.2.4 Alternative 4: Focused Excavation, Zones 1, 2 and 3; Off-Site Treatment/Disposal; Institutional Controls

It is suggested this alternative be referred to as "Focused Excavation and Offsite Disposal, Zones 1, 2 and 3; Vegetated Soil Cover and Institutional Controls". Some explanation should be provided for adding excavation of Zone 3 to this alternative. For example, brief information regarding the relative depth of waste in the three zones should be provided. Again, a continuous cover over the site, including the locations of Zones 1, 2, and 3, should be considered.

Response: Vegetative cover has been added to this alternative. In addition, other text revisions have also been made.

4.2.5 Alternative 5: Complete Excavation; Offsite Treatment Disposal

Suggested this alternative be referred to as "Complete Excavation and Offsite Disposal". It should be indicated that by removing all landfilled material, maintenance of a soil cover would not be necessary. It should be indicated that this alternative would include removal of all material placed at or below the original ground surface as well as material deposited on the original ground surface.

Response: This alternative has been revised according to comments received. The revised alternative includes the removal of all surface soil (residential risk) and the removal of subsurface soils from two areas containing contamination greater than PRGs as well as the removal of the "mounded" area to the southwest which contained some contaminants greater than residential subsurface PRGs.

5.0 DETAILED ANALYSIS OF ALTERNATIVES

Under Alternatives 3 through 5, it is assumed all excavated material would be disposed offsite. However, per comments on Section 3.3.1, a significant quantity of the subsurface material at Sites 6/7 could be considered clean fill, e.g., concrete demolition debris. Segregation of clean fill could result in significant cost savings.

Response: The alternatives have been revised to include segregation of materials, e.g. concrete, but off-site disposal is still assumed for all media. Past excavations have required offsite disposal of all material exceeding PRGs. Alternative 5 has been revised to limit the area of subsurface excavations. It is highly unlikely that any material excavated will meet the Clean Fill requirements under PADEP standards.

5.3.2 Alternative 2

5.3.2.1 Detailed Description

Again, while it is assumed an adequate cover is already in place over the site, available information (e.g., soil boring and test pit logs) indicates this is not the case in certain areas. Some costs should be assumed for completing the soil cover, grading and revegetation.

Response: This text has been revised according to the comment and above responses. The Navy has not placed cover material at the site as was planned during the preparation of the draft document.

Signage may be necessary only for those areas where waste of concern is known to be within 2 feet of ground surface, e.g., Zones 1 and 2, depression southwest of trench TR11.

Response: The text has been revised to delete any mention of signage. This has been deleted in response to concerns by other reviewers that this may not be warranted. If necessary this requirement can be included in the final remedy described in the ROD. The revised alternative requires a vegetated cover of at least 2 feet in thickness.

5.3.3 Alternative 3

It is indicated that under this alternative, waste material in Zone 3 would remain in place at a depth of about 7 feet below ground surface. However, per previous comments on the RI, waste of concern in the southern portion of this zone starts at about 2 feet below ground surface.

Response: The text has been revised to address this concern.

5.3.3.1 Detailed Description

Again, while it assumed that 20 percent of the excavated materials would be classified as hazardous waste and would require treatment and/or disposal by a RCRA TSD facility, available information suggests that the soils/waste characterized by the RI are unlikely to be a RCRA hazardous waste. For example, while industrial waste treatment sludge has apparently been disposed at the site, disposal parameter testing for a similar material at Site 1 indicates that only material with cadmium levels exceeding 400 mg/kg reasonably likely to require disposal by a RCRA TSD facility. Given the maximum concentration of cadmium detected to date at Site 6/7 is 152 mg/kg, disposal by a RCRA TSD facility appears unlikely to be necessary.

Response: The text and the cost estimate has been revised. The revised estimate is based on 2 percent of the material requiring RCRA hazardous waste handling and disposal. This estimate is based on actual percentages encountered in performing the removal action at Site 6.

While signs may be appropriate for locations where waste of potential concern is within 2 or 3 feet of ground surface (e.g., Zones 1 and 2), signs may not be necessary for areas where waste of concern is well below 3 feet in depth, e.g., the majority of Zone 3.

Response: Reference to signage has been deleted in response to comments from PADEP and Municipality reviewer concerns.

Under Overall Protection of Human Health and the Environment, it is suggested that contaminant levels are higher concentrations in Zones 1 and 2 than Zone 3. However, the soils in Zone 3 present the highest risk. Please correct/clarify.

Response: This text has been clarified. The revised text states that Zones 1 and 2 contain a discernable layer of contamination that is relatively closer to the surface than in other areas. No comparison to Zone 3 is made.

5.3.4 Alternative 4

5.3.4.1 Detailed Description

Again, based on available data, it appears unlikely that a significant quantity of the excavated material would be determined to be a RCRA hazardous waste.

Response: See response regarding the cost estimate and the percentage anticipated requiring RCRA handling.

As noted in previous comments, it appears that the area of excavation for Zone 3 may not have been reasonably estimated. A more reasonable estimate of the length and width of the excavation area should be provided. In addition, given the fill placed over the apparent sludge disposed at Zone 3 appears to be clean soil and debris, it may not be reasonable to assume that this material will be disposed offsite. It is suggested that the assumption that this material will require off-site disposal be re-assessed.

Response: The area to be excavated has been revised in response to this comment. It is assumed that all material will be disposed offsite. In order for excavated material to remain on site and be used as backfill within the area of concern, it would have to be shown that the material contains contaminant levels below the PRGs. This would require stockpiling of discrete excavated soil, sampling, soil management practices, and comparison to PRGs and possible re-sampling or further segregation. The anticipated costs associated with this effort and the management of this effort is comparable to the anticipated loading and offsite disposal costs.

5.3.5 Alternative 5

5.3.5.1 Detailed Description

As suggested above, offsite disposal of all of the material deposited or filled at the site does not appear to be necessary. It is suggested that PADEP be consulted regarding procedures to be followed during excavation of landfilled materials. Of interest would be procedures to be followed in segregating/testing fill materials which appear to be "clean". In addition, in the case of this alternative in particular, the assumption that 20 percent of the excavated material materials would be classified as hazardous waste does not appear to be reasonable.

Response: See above response regarding the offsite disposal requirements. In addition, PADEP regulations require that any excavated material in excess of the residential/reuse PRGs be disposed of

properly and in accordance with applicable regulations. The residential PRGs are very restrictive and extensive soil/media handling/stockpiling would be required during the sample analysis period. It is likely that a large percentage of the material would exceed PRGs and would require offsite disposal. It should also be noted that this site is not considered by PADEP as a landfill. Finally as indicated in previous responses, none of the excavated material is expected to achieve the clean fill standards.

The unit costs for transportation and disposal of hazardous waste are higher for Alternative 5 than Alternative 3 and 4. It is not clear why. (As noted above, this may not be of concern if the final cost estimates assume that a minimal quantity of the waste will be RCRA hazardous as available data suggests.)

Response: The unit costs for Alternative 5 have been corrected.

Compliance with ARARs and TBCs

It should be indicated that the level of remediation in this case is more stringent than that required to achieve RAOs for the reasonably anticipated land use of recreation. In addition, the level of remediation is more stringent than that required to meet the requirements of 25 PA Code 75 for closure of similar landfilled areas.

Response: A statement regarding the anticipated land use has been added. No reference to 25 PA Code 75 has been added as PADEP has determined that this site is not considered to be a landfill.

6.0 COMPARATIVE ANALYSIS OF ALTERNATIVES

6.1 OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

While it is indicated that "...Alternative 5 provides for the most complete and permanent action", this alternative does not necessarily appear to be more protective than Alternatives 2 through 4 for the reasonably anticipated future land use of recreation.

Response: This has been noted.

6.3 LONG-TERM EFFECTIVENESS AND PERMANENCE

It is indicated that "...Alternative 3 offers an added sense of permanence by removing the most likely sources of human exposure." This sentence should read "...by removing the more accessible portion of material which presents an unacceptable risk." It is indicated that "...Alternative 4...would diminish the area requiring the enforcement of excavation restrictions." However, as noted, a continuous soil cover over the entire site should be considered. In addition, the likelihood of excavation to the depth of most of the known waste of concern in Zone 3 under the reasonably anticipated land use of recreation appears to be minimal.

Response: The text has been revised to incorporate this comment.

It may be added that in the event that the cover and/or institutional controls fail, Alternative 3 has the advantage of removing waste that is known to present an unacceptable risk and be relatively accessible. Alternative 4 adds removal of remaining waste which is known to present an unacceptable risk, but most of this additional waste is relatively inaccessible under the reasonably anticipated land use of recreation.

Response: See response to above comment.

TABLE 6-1

Under LONG-TERM EFFECTIVENESS AND PERMANENCE

Magnitude of Residual Risk - Under Alternatives 3 through 4, it is indicated that risks would remain but at "manageable levels". It is unclear what this means. Instead, this section should identify the actual risks that would remain under each alternative, i.e., sitewide risks, risks associated with Zones 1, Zone 2 and/or Zone 3.

Response: This Table has been revised.

Adequacy and Reliability of Controls - It should be noted that Alternative 3 removes the most accessible soils of concern, rather than a "limited surface soil removal" . In addition, while Alternative 3 does not include the removal of soils from Zone 3, this alternative may be considered similar in reliability to Alternative 4 due to the relative inaccessibility of most of the soil of concern in Zone 3.

Response: The text has been revised.

Under REDUCTION OF TOXICITY, MOBILITY OR VOLUME THROUGH TREATMENT

As indicated above, treatment of excavated soil and waste does not appear likely to be necessary.

Response: As indicated in previous response, this process option has been retained.

Under IMPLEMENTABILITY

Ability to Obtain Approvals and Coordinate with Other Agencies - It should be noted that coordination with local authorities will be required to implement institutional controls.

Response: This has been noted as requested.

APPENDIX B, Costs

As noted, in certain cases, the vegetated soil cover may be inadequate at this time. It should be assumed that at least some additional cover will be necessary. Appropriate estimates of capital costs for backfilling, regrading, and vegetation should be included in costs for Alternatives 2 through 4.

Response: The revised alternatives and cost estimates include this information.

As noted, the amount of RCRA hazardous waste present at the site is expected to be minimal and costs should be adjusted accordingly. In addition, the cost of hazardous waste transportation / disposal for Alternative 5 is not consistent with Alternative 3 and 4. Based on the information provided from Waste Management Inc., please correct the costs in this regard for Alternative 5.

Response: The percentage of hazardous waste has been revised based on actual materials encountered during the completed removal actions. The unit rates for Alternative 5 have been corrected.

The size of the soil staging area for Alternatives 3 through 5 is identical. Given the considerably larger volume of material under Alternative 5, a larger staging area may be appropriate.

Response: This has been addressed in the revised cost estimates.

The numbered comments in the last column of the cost tables should be included as footnotes.

Response: The last column has been clarified and provides a Means reference for each line item used in the cost estimate.

Given all soils will be removed to bedrock under Alternative 5, the basis for the number of verification samples is unclear.

Response: The basis for the number of verification samples has been clarified. Verification samples will still be required from the sidewalls even if excavation is to bedrock.

Should you have any questions regarding the comments above, please call me at 215-814-3360.

Sincerely,

Darius Ostrauskas

Remedial Project Manager

cc: Thomas Ames, NAWC

April Flipse, PADEP